

Open Research Online

The Open University's repository of research publications and other research outputs

Notes on the taxonomy, iconography, and ecology of *Aloe pluridens* Haw. (Asphodelaceae: Alooiidae), an endemic species from southeastern South Africa

Journal Item

How to cite:

Walker, Colin C.; Smith, Gideon F. and Figueiredo, Estrela (2019). Notes on the taxonomy, iconography, and ecology of *Aloe pluridens* Haw. (Asphodelaceae: Alooiidae), an endemic species from southeastern South Africa. *Bradleya*, 37 pp. 60–72.

For guidance on citations see [FAQs](#).

© 2019, BCSS, authors and illustrators of individual papers



<https://creativecommons.org/licenses/by-nc-nd/4.0/>

Version: Version of Record

Link(s) to article on publisher's website:

<http://dx.doi.org/doi:10.25223/brad.n37.2019.a28>

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data [policy](#) on reuse of materials please consult the policies page.

oro.open.ac.uk

Notes on the taxonomy, iconography, and ecology of *Aloe pluridens* Haw. (Asphodelaceae: Alooideae), an endemic species from southeastern South Africa

Colin C. Walker¹, Gideon F. Smith^{2,3} & Estrela Figueiredo^{2,3}

1. School of Environment, Earth & Ecosystem Sciences, The Open University, Milton Keynes, MK7 6AA, England. (email: c.walker702@btinternet.com).

2. Department of Botany, P.O. Box 77000, Nelson Mandela University, Port Elizabeth, 6031 South Africa.

3. Centre for Functional Ecology, Departamento de Ciências da Vida, Calçada Martim de Freitas, Universidade de Coimbra, 3001-455 Coimbra, Portugal. (email: epnfigueiredo@gmail.com; smithgideon1@gmail.com).

Summary: The history of the discovery of *Aloe pluridens* Haw. (Asphodelaceae: Alooideae) by the Kew collector James Bowie in 1822–23 in the Eastern Cape Province of South Africa and its subsequent description in 1824 is discussed. The surprising dearth of published illustrations of this long-known species is emphasised and the first known photograph dating from only 1900 is reproduced. It is also shown that a painting at Kew by George Bond that dates from 1829 does not qualify as having been associated with the species by the author of the name, Adrian Hardy Haworth and cannot supersede the specimen on which the name *A. pluridens* was previously effectively neotypified. The name *A. pluridens* Haw. var. *beckeri* Schönland is lectotypified and it is shown that the name *Aloe atherstonei* does not have a type as it was previously typified on an apparently non-existent specimen. Additionally the species is illustrated both in habitat and in cultivation. Observations on the ecology and cultivation of the species are also included.

Zusammenfassung: Die Geschichte der Entdeckung von *Aloe pluridens* Haw. (Asphodelaceae: Alooideae) durch den Kew-Sammler James Bowie in den Jahren 1822–23 in der Ostkap-Provinz Südafrikas und deren anschließende Beschreibung im Jahr 1824 wird diskutiert. Der überraschende Mangel an veröffentlichten Illustrationen dieser altbekannten Art wird herausgestellt und die erste bekannte, bereits aus dem Jahr 1900 stammende Fotografie wird reproduziert. Es zeigt sich, dass ein 1829 von George Bond in Kew gemaltes Bild nicht durch den Namensautor Adrian Hardy Haworth mit der

Art in Verbindung gebracht werden kann, und dass es nicht den Beleg, mit dem der Name *A. pluridens* zuvor effektiv neotypisiert wurde, ersetzen kann. Der Name *A. pluridens* Haw. var. *beckeri* Schönland wird lectotypisiert und es wird gezeigt, dass der Name *Aloe atherstonei* keinen Typus hat, da er zuvor durch einen scheinbar nicht existierenden Beleg typisiert wurde. Zusätzlich werden Bilder der Art im Habitat und in der Kultur präsentiert. Beobachtungen zur Ökologie und zur Kultur der Arten werden auch beschrieben.

Discovery and description

During the reign of King George III (1738–1820), Sir Joseph Banks (1743–1820) was the unofficial director of the Botanic Gardens at Kew — then a private royal establishment — from sometime before 1773 till his death in 1820 (Desmond, 1995). Banks established a policy of enhancing the living plant collections at Kew through the royal sponsorship of overseas plant collectors. First and foremost of these was Francis Masson (1741–1805) who undertook three journeys in South Africa between 1772 and 1774 and sent back significant collections, notably of ericas, mesembryanthemums, pelargoniums, and stapeliads (Gunn & Codd, 1981). Incidentally, during this time Masson discovered and named the iconic quiver tree, an arborescent aloe now known as *Aloidendron dichotomum* (Masson) R.R.Klopper & Gideon F.Sm., from arid western South Africa.

Building on the success of Masson, another Kew gardener, James Bowie (c.1789–1869), was also despatched to South Africa. Bowie came to Kew in 1810 and his first plant collecting trip was

to Brazil to accompany Allan Cunningham between 1814 and 1816. He was then instructed to sail for the Cape. He left Brazil on 28 September 1816 on the *Mulgrave Castle* and arrived in Table Bay on 1 November 1816 (Hutchinson, 1946; Smith & Van Wyk, 1989). Initially during his stay at the Cape, Bowie concentrated his collecting activities around Cape Town. He then undertook four journeys eastwards for which the localities visited are tabulated by Smith & Van Wyk (1989). Of significance here is his third journey lasting approximately a year which took him as far east as Boesmansrivier, Kowie, and Grahamstown. On his fourth journey he explored lesser known eastern and southeastern parts of the then Cape Colony and also collected in the northeastern Cape in the vicinity of Colesberg [now part of the Northern Cape Province of South Africa].

Banks died on 19 June 1820 whilst Bowie was in South Africa. The British Parliament subsequently restricted funds for Kew's plant collecting activities and Bowie was recalled. On 23 May 1823 he sailed from Cape Town for England on the *Earl of Egremont* and arrived in London on 15 August 1823. Bowie was then no longer a Kew employee although he did later revisit South Africa privately where he died in Cape Town on 2 July 1869 (Smith & Van Wyk, 1989). He is commemorated in the names of some succulents, notably the genus *Bowiea* Haw. [Hyacinthaceae] and *Aloe bowiea* Schult. & J.H. Schult.

Aloe pluridens (Figure 1) was described by the English botanist Adrian Hardy Haworth (19 April 1767–24 August 1833). Haworth (1824) wrote: "Hereunder I transmit to you a second decade of new succulent plants, all of the Aloëan family – all recently from the Cape of Good Hope – all now flourishing in the Royal Gardens of Kew; and all sent thither from their native wilds by their discoverer Mr. Bowie, our gracious sovereign's most successful collector of succulent plants." Haworth described his new species simply as: "pluridens. A. (many-toothed Tree Aloe) *foliis capitatis ensiformibus recurvantibus viridibus, dentibus marginalibus, validis numerosis incurvis.*" [*Aloe pluridens*. - (many-toothed Tree Aloe), leaves crowning the stem, sword-shaped, recurved, green, teeth on the margins very numerous, strong, incurved.] Note particularly that this very brief description only deals with vegetative parts and there is no mention whatsoever of the flowers. We can therefore assume that in 1824 Haworth had not seen flowers of this species. His chosen epithet '*pluridens*' refers to the 'many teeth' (Figure 2) of the leaf margins (Grace *et al.*, 2011). He also says nothing about its habitat nor



Figure 1. *Aloe pluridens* flowering north of Uitenhage, Eastern Cape Province, South Africa.

Photograph: Gideon F. Smith.



Figure 2. The leaf margins of *Aloe pluridens* are adorned with numerous, small, whitish to concolorous teeth.

Photograph: Gideon F. Smith.



Figure 3. Image of *Aloe pluridens*, here published in colour for the first time. The illustration by George Bond is inscribed verso: “An imported plant from the Cape of Good Hope by Mr. Bowie in 1823.” Reproduced with the kind permission of the Director and the Board of Trustees, Royal Botanic Gardens, Kew.

does he refer to any preserved material to which this species name is specifically attached, apart from the initial statement that the material is flourishing (i.e. not merely preserved) at Kew. Finally he compares his new species to *A. arborescens*, of which more below.

Later Bowie (1830) provided the following observations: "The stem of this species rises to the height of 8 to 10 feet, and is strongly formed. The leaves are disposed in a spiral or screw form, gracefully pendant, flower stems generally two, branching into three or more spikes; flowers of a brilliant scarlet colour, displaying themselves in June, July, and August. Inhabits a range of hills East of Boschjesmans River (now officially Boesmansrivier), where it was first discovered by Mr. Bowie." We can therefore take this location to be the type locality. Note though that in *A. pluridens* flower colour generally ranges from bright orange to salmon pink, to very rarely reddish or yellow, but scarlet flowers, as is common in the related *A. arborescens*, have yet to be encountered in *A. pluridens*. It is interesting that Bowie only collected *A. pluridens* at Boesmansrivier, which is about 130km east of Port Elizabeth. In the 1820s and 1830s Port Elizabeth, which developed from the military station known as Fort Frederick, was a small but thriving settlement on the shores of Algoa Bay, and Bowie is known to have visited the area on several occasions during his travels to the eastern parts of the then Cape Colony (Smith & Van Wyk, 1989). *Aloe pluridens* is very common in the Port Elizabeth-Despatch-Uitenhage region.

Returning to Bowie's collecting activity at the Cape, when, therefore, did he collect *A. pluridens*? Smith & Van Wyk (1989) tabulate that Bowie was at Boesmansrivier on 5 November 1820 during his third journey (early 1820–29 January 1821). He returned to this area in February–March 1822 during his fourth and final journey (24 May 1821–4 December 1822). Based on his routes (Smith & Van Wyk, 1989) he could reasonably have collected his material of *A. pluridens* during either of these excursions.

Type of the name *Aloe pluridens*

It is not known if Haworth obtained Bowie-collected herbarium specimens from Kew or if he described the plant based only on material that was cultivated there. From the statement included in the protologue quoted above (Haworth, 1824: 298) it is clear that at least he saw living material "flourishing" at Kew.

After Haworth died, his herbarium was bought by the English botanist Henry Borron Fielding (1805–1851). Fielding used this herbar-

ium for study and most specimens were thrown away (Clokier, 1964: 180). What remained of Haworth's herbarium was later bequeathed to the University of Oxford, together with the rest of Fielding's herbarium. It is now kept at OXF (The Fielding-Druce Herbarium). There are no specimens of *A. pluridens* among the collections originating from Haworth (Serena Marner, pers. comm.). The specimen grown at Kew and described by Haworth does not appear to have been preserved in Herb. K either.

The Royal Botanic Gardens, Kew, hold a collection of paintings of which a significant number depict succulents, executed by the gardeners Thomas Duncanson and George Bond (Hunt, 1988; Blunt & Stearn, 1994: 196, 248; Rowley, 1997). We know little about Duncanson and Bond, but Desmond (1995) provides some background. In 1822 William Townsend Aiton, as head gardener, gave Duncanson the role of artist with the responsibility of drawing new acquisitions. He continued this work for four years until ill health forced his resignation. He was replaced by Bond who continued painting for a further nine years. Together these amateur artists produced a collection of around 2000 paintings, the majority by Bond (Desmond, 1995). Most of these paintings, notably the succulents, regrettably remain unpublished to this day.

The Kew Art Collections include an early illustration of *A. pluridens* (Figure 3) from the Duncanson and Bond collection (Patricia Long, pers. comm.). This plate is dated "Dec 22–23 1829" in feint writing at the base below the inked name "*Aloe pluridens*". To the bottom left of the artwork is the outlined capital letter 'B' and in the top right hand corner is the pencil number "1036". The number "176" appears in the top left hand corner of the painting, and the number "A73/2" is written next to the painting in the left hand bottom of the backing board. Verso of the drawing states "An imported plant from the Cape of Good Hope by Mr. Bowie in 1823." This painting is visually attractive and a remarkable accomplishment for someone in Bond's position. It is a faithful representation of *A. pluridens*, bar the skirt of dried leaves at maturity, showing its principal features. The date and the letter 'B' all point to Bond rather than Duncanson being the artist. Hunt (1988) wrongly attributes this painting to Duncanson. There is a manuscript catalogue at Kew by Richard Cunningham of the Duncanson paintings to whom over 700 are attributable. The drawings are indexed and numbered in systematic order and the catalogue numbers are inscribed on the drawings (Hunt, 1988). However,

unlike other known Duncanson drawings listed, the one of *A. pluridens* does not have a Duncanson catalogue number. Hunt suggests that this was painted in 1823, but this is incorrect because the plant was only received that year and is shown in flower in the painting. Further evidence to refute Hunt's proposed artistic ownership is the fact that Haworth (1824) does not describe the flowers, presumably because these had not yet been produced at Kew. Haworth may not have seen the painting and indeed he may not even have seen the plant in flower. The painting though is based on the same material used by Haworth for his description, so this painting is available to be considered for typification of the species (but see below).

An additional point of correction is required. Reynolds (1950: 415, Fig. 454) wrongly attributes the painting of *A. pluridens* to another Kew artist, Franz Bauer. Bauer (1758–1840) was a highly regarded botanical artist in the golden age of flower painting, notable for his paintings particularly of orchids and ericas (Blunt & Stearn, 1994), but there is no evidence that he painted any of the newly introduced succulents at Kew.

The type (holotype, lectotype, or neotype) of a name of a species or infraspecific taxon is either a single specimen conserved in one herbarium or other collection or institution, or an illustration (Turland *et al.*, 2018: 16, Article 8.1). Further, Article 9.4 of the *Code* states that a lectotype is a specimen or illustration designated from the **original material** [emphasis by present authors] as the nomenclatural type, if no holotype was indicated at the time of publication. Under the Shenzhen *Code* original material includes elements “that **the author associated with the taxon** [emphasis by present authors], and that were available to the author prior to, or at the time of, preparation of the description”. The Kew plate undoubtedly depicts the material that was dispatched to England and grown at Kew from which Haworth described the species. However, this plate cannot have the status of holotype as it was not cited by Haworth (1824) and there is no evidence that it was “the **one** [emphasis by present authors] specimen or illustration [...] either (a) indicated by the author(s) as the nomenclatural type or (b) used by the author(s) when no type was indicated” (Turland *et al.*, 2018: 19–20, Article 9.1).

Until recently it had to be shown that the validating description or diagnosis was based on certain specimens or illustrations in order for them to qualify as original material, but this is no longer required. The present *Code* (Turland *et al.*, 2018: 21, Article 9.4(d)) allows for duplicates of type ma-

terial (isotypes or isosyntypes) that were not seen by the author to be considered as original material.

Nevertheless, in this case, even though indications are that the plate represents the material on which the description was based, the illustration was produced several years after the species was published so the plate cannot possibly be considered as having been “...associated with the taxon...” by the author (Turland *et al.* 2018: 21, Article 9.4(a)). Since Glen & Smith (1995) have already designated a neotype for the name *A. pluridens*, their designation was effective and must stand.

Later illustrations

Reynolds (1950: 417) noted that “It is surprising that no figure was published in Salm Dyck's *Monograph* and none in the *Botanical Magazine*. It seems that the first published [illustration] was in 1900.” The first published image of *Aloe pluridens* is reproduced here (Figure 4). It shows a plant growing at La Mortola, Sir Thomas Hanbury's magnificent garden on the Italian Riviera at Ventimiglia (Smith & Figueiredo, 2014). There Alwin Berger (1871–1931) was curator from 1897 till 1914, from where he published many notable books and reviews on succulents, his monograph of the Aloineae (Berger, 1908) being especially relevant here. Berger (1900) published a photograph of the La Mortola plant in flower. He recorded it as being both beautiful and rare, but not a novelty having been introduced by Bowie before 1820. The single specimen flowered regularly for several years in February after being rescued from very bad conditions and given a place in the sun. The stem of the plant was 1.1m tall, about 8cm in diameter, simple, and dark brown. Berger regretted not being able to distribute the species further because it had not produced any lateral or ground branches nor any seed. The line drawing published in the later monograph (Berger, 1908: 294, Fig. 121) is clearly based on the earlier photograph (compare Figures 4 and 5).

Before Reynolds' (1950) monograph of the southern African aloes the only other illustrations of this species were published by Christian (1933) and Phillips (1936). For a species first described in 1824 it has been rarely illustrated until the latter half of the 20th century.

Infrageneric classification of *Aloe pluridens*

Aloe pluridens is included in *A. sect. Arborescentes* Salm-Dyck (Salm-Dyck, 1836–63), an essentially southern and south-tropical African group that includes *A. arborescens* Mill., *A. hardyi*

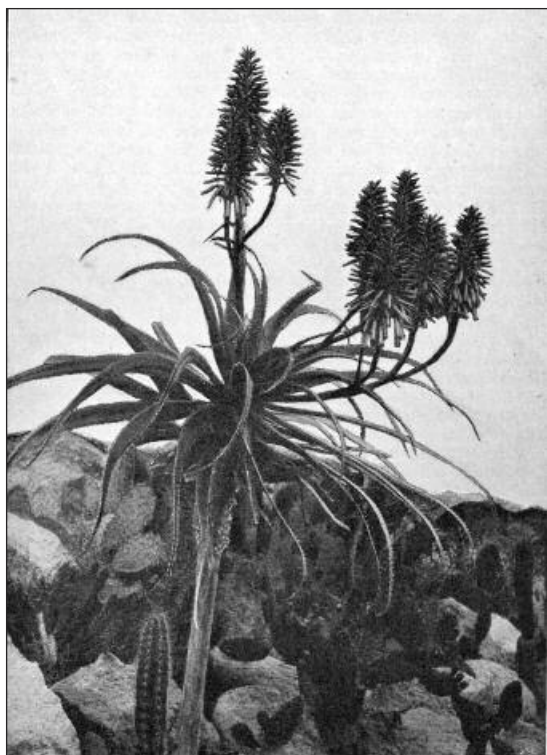


Figure 4. The first published illustration of *Aloe pluridens* from Berger (1900).

Glen, *A. mutabilis* Pillans, and *A. vanbalenii* Pillans. The species in this group range from virtually stemless (*A. vanbalenii*), through a pendent cliff-dweller (*A. hardyi*) and medium-sized to large shrubs (*A. mutabilis* and *A. arborescens*), to the somewhat tree-like *A. pluridens* and some forms of *A. arborescens*. Even though Glen & Hardy (2000) described the racemes of the species included in this group as “cylindric to conical”, all the species have conical racemes, if narrowly to elongated so, as in the case of *A. vanbalenii*. The flowers of all the species are narrowly cylindrical and pencil-shaped.

Later, in an attempt to provide a classification for the entire genus *Aloe*, mostly based on Berger (1905, 1908), Jacobsen (1970: 68) added the Madagascan *A. bulbilifera* H.Perrier to what he treated as *Aloe* sect. (IV. *Aloe* subsect. E. *Magnae* A.Berger] ser. [28]) *Arborescentes*, a view with which we do not agree.

The closest relative of *A. pluridens* is *A. arborescens* from which it differs in often being taller and more slender (Figure 6), with the leaf marginal teeth contrasting against the leaves to give the rosettes a pearly appearance at a distance (Figure 9). Its leaves are narrower and light- to

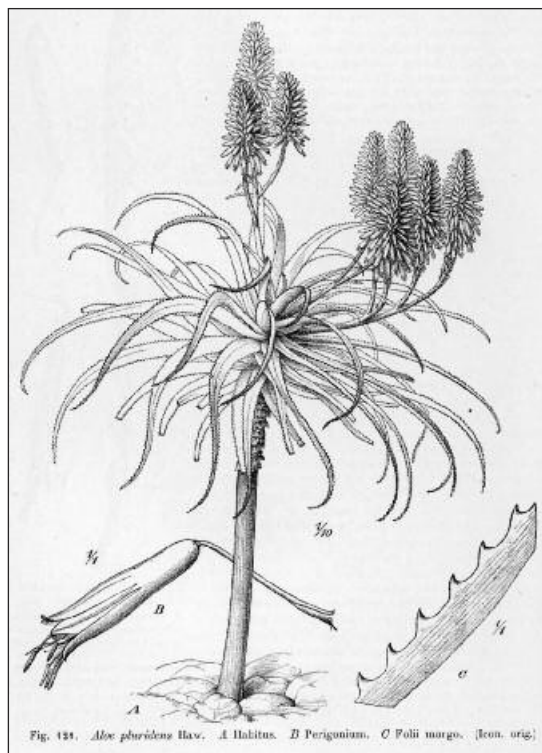


Figure 5. Drawing of *Aloe pluridens* from Berger (1908), based on the photograph (Figure 4) from Berger (1900).

yellowish green with smaller and more crowded pinkish white teeth (Figure 2). The racemes of *A. pluridens* are fewer flowered than those of *A. arborescens*, slightly laxer, and less acuminate (Reynolds, 1950) (Figure 7). The fruit of *A. pluridens* is a characteristic reddish brown to chocolate brown colour (Figure 8). The exposed parts of the stems of *A. pluridens* below the skirt of leaves are greyish to brownish grey, and small, perfectly formed plantlets often develop on the stems; these will regularly produce roots while still attached to the stem (Figure 10).

Jeppe (1969) records that for *A. pluridens* “the colourless leaf-sap has a strong rhubarb-like odour”.

Notes on the geographical distribution range and ecology of *Aloe pluridens*

The main natural geographical distribution range of *A. pluridens* is restricted to the Eastern Cape Province of South Africa, where it is a typical component of what used to be commonly referred to as “Valley Bushveld” vegetation. The species is widely distributed in the Albany Centre of Endemism, with its range petering out into the



Figure 6. *Aloe pluridens* in habitat near to the Kariega River in the Eastern Cape Province of South Africa. Photograph: Colin C. Walker.



Figure 7. *Aloe pluridens* is a common species in the coastal and near-coastal parts of the Eastern Cape Province, South Africa. Its inflorescences are somewhat less dense than those of *A. arborescens*. Here the species is in flower in July 1995 at Blue Water Bay on the banks of the Swartkops River, near Port Elizabeth.

Photograph: Gideon F. Smith.



Figure 8. The fruit of *Aloe pluridens* is a characteristic reddish brown to chocolate brown colour.

Photograph: Gideon F. Smith.

Maputaland-Pondoland Region of Endemism to the northeast (Van Wyk & Smith, 2001). A single locality has been confirmed for *A. pluridens* in KwaZulu-Natal, near Durban. The species is not known to occur between these two locations, with the discontinuity appearing to be real and not the result of under collecting or local extinctions along the eastern parts of the Eastern Cape and western parts of the KwaZulu-Natal coasts and surrounding areas (Figure 13).

The Eastern Cape thicket vegetation in general is dense, rather impenetrable and spiny through the presence of numerous species, such as *Azima tetraacantha* Lam. (commonly known as speldedoring in Afrikaans and needlebush in English) (Salvadoraceae), which are heavily armed. In many places the thickets have closed, but low canopies that in chequered patches yield lightly to heavily shaded habitats under the shrubby and



Figure 9. Several large, branched specimens of *Aloe pluridens* in habitat 7km north of Uitenhage, en route to Jansenville. The leaves are gracefully recurved and typically tilted to one side.

Photograph: Estrela Figueiredo.

arborescent species. Perhaps somewhat counter-intuitively numerous succulent plant species flourish in the comparative low light intensity that reaches the undergrowth.

Aloe pluridens is well-adapted to thrive in thicket vegetation (Figures 1, 6 & 7). Especially when still young, plants flourish in shaded positions, a preference retained when the species is cultivated well away from its natural habitat. It can take several years for plants to emerge from the tangled thicket undergrowth and eventually overtop the canopies of the species with which it grows socially. At that stage the leaves have started recurving to form fountain-shaped rosettes.

The leafy rosettes of several species of *Aloe* are tilted to one side at maturity (Figure 9), those of *A. pluridens* and *A. speciosa* Baker, also an essentially Eastern Cape, South Africa, species, being good examples; in the case of the latter species it has even given rise to the common name

‘tilt-head aloe’. One possible explanation for the tilting of the rosettes is that it makes it more difficult for aloe snout weevils, a destructive pest present wherever aloes grow in profusion, to readily gain access to the centre of the crown of leaves where they preferentially feed.

Nomenclature of *Aloe pluridens*

Aloe pluridens Haw. in *Philos. Mag. J.* 64: 299 (1824 [Oct]). Schultes & Schultes (1829: 709); Baker (1880: 176); Baker (1896: 322); Berger (1900: 137); Schönland (1903: 43); Berger (1908: 294, Fig. 121); Marloth (1915: 76); Christian (1933: 13); Phillips (1936: t. 610); Groenewald (1941: 40); Reynolds (1950: 415); Jacobsen (1960: 195); Higgins (1960: 124, Fig. 47); Jeppe (1969: 47); Bornman & Hardy (1971: 225); Jacobsen (1974: 93); Glen & Hardy (2000: 114); Newton (2001a: 165); Newton (2001b: 147); Smith & Van Wyk (2008: 70); Klopper & Smith (2010: 42); Carter *et al.* (2011: 684); Grace *et al.* (2011: 124);



Figure 10. A profusion of plantlets often develops on the exposed parts of the stems of *Aloe pluridens*. Note the development of roots while the plantlets are still attached to the stem.
 Photograph: Gideon F. Smith.



Figure 11. Seedling of *Aloe pluridens*, c. 4-year old, showing basal branching.
 Photograph: Colin C. Walker.



Figure 12. Inflorescence of *Aloe* 'Spiraal', a hybrid between *A. mutabilis* and *A. pluridens*.
 Photograph: Gideon F. Smith.

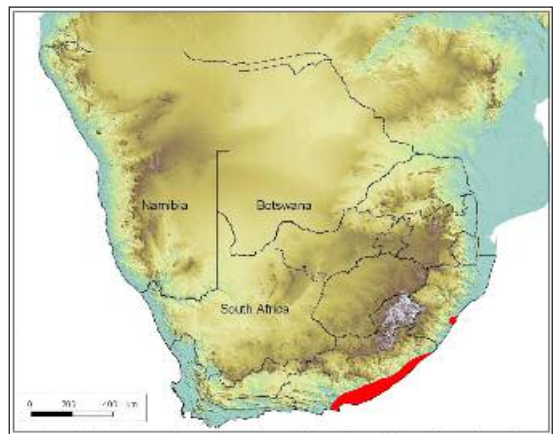


Figure 13. Known natural geographical distribution range of *Aloe pluridens* in southern Africa.

Van Wyk & Smith (2014: 70); Klopper (2015: 260); Smith *et al.* (2017: 146). **Neotype:** SOUTH AFRICA. EASTERN CAPE PROVINCE [Cape], Ettrick Hills near Carlisle Bridge, *G.W. Reynolds 1425* (PRE), designated by Glen & Smith (1995).

Synonyms

Aloe atherstonei Baker in *J. Linn. Soc., Bot.* **18**: 170 (1881). **Type:** not designated (see discussion below).

Nomenclatural notes:

Glen & Hardy (2000: 114) cite a specimen kept in Herb. K, “*Atherstone s.n.*”, from the “Eastern Cape, no precise locality” as the “Type” of the name *A. atherstonei*. However, it seems as though no voucher was ever made from the material of *A. atherstonei* cultivated at Kew, and no such specimen [“*Atherstone s.n.*”] could be traced in the Herbarium. The abbreviation “V.v.” used by Baker in the protologue of the name *A. atherstonei* is for “*Vidi vivam*”, and means “[I have] seen it in the living state”. In 1878 it was perfectly acceptable for a species to be described from living material with no voucher being prepared (Harry Smith, pers. comm.).

Aloe pluridens Haw. var. *beckeri* Schönland in *Rec. Albany Mus.* **1**: 43 (1903). Berger (1908: 295). **Lectotype:** “From a plant grown in Dr. Becker’s garden received from Mauritius (originally probably from S. Africa) Flowered July 1899.”, *Becker s.n.*, Albany Museum No. 7271 [Barcode: GRA0027477], (GRA), **designated here**.

Nomenclatural notes:

When describing *A. pluridens* var. *beckeri*, Schönland (1903) named it for Dr H. Becker who sent material to him from cultivation in Mauritius, stating that “he [Dr Becker] has reason to believe that it was taken there originally from South Africa.” Schönland did not cite any specimens or illustrations in the protologue.

Glen & Hardy (2000: 114) give the “Type” of *A. pluridens* var. *beckeri* as “Hort. (?) Mauritius, *Becker s.n.* (GRA)”. However, GRA holds three specimens of *Aloe pluridens* var. *beckeri* that were received from Dr Becker, all three with the designation “*Becker s.n.*” (Tony Dold, pers. comm.). The labels of all three appear to be in Schönland’s handwriting.

The three specimens are:

1. Albany Museum No. A.7270, with “No. ~~154~~ [i.e., struck through]” and “*Aloe pluridens* var. *Beckeri* Schonl’ Flowered in Dr. Becker’s Garden June 1902.” written on the label. [Barcode: GRA0027479]. A copy of the protologue is at-

tached to this specimen.

2. Albany Museum No. 7271, with “~~50~~”, “~~40~~” [i.e., both struck through], and “(154)”, and “*Aloe pluridens* Haw. var. *Beckeri*” written on the sheet. On the specimen label is written: “From a plant grown in Dr. Becker’s garden received from Mauritius (originally probably from S. Africa) Flowered July 1899.” A small sheet containing handwritten notes (in Dr Becker’s handwriting?) about the plant is attached to the specimen. [Barcode: GRA0027477].
3. Albany Museum No. 7273, with “No. ~~154~~ [i.e., struck through]” and “*Aloe pluridens* Haw. flowered in Dr. Beckers [sic] garden June 17. 1902.” written on the label [barcode: GRA0027478].

These specimens are not duplicates and definitely do not refer to a single gathering (Turland *et al.*, 2018: 24, Article 9.17), as they were collected on different dates, in the case of ‘Albany Museum No. 7271’ several years before the other two. All three *Becker s.n.* specimens predate, and were therefore available to, Schönland (1903) when he published *A. pluridens* var. *beckeri*. Under Turland *et al.* (2018: 21, Art. 9.4(a)) they therefore qualify as original material. The typification of Glen & Hardy (2000: 114) of *A. pluridens* var. *beckeri* does not refer to a single specimen (Turland *et al.*, 2018: 16, Art. 8.1) and cannot be narrowed down in a second-step lectotypification (Turland *et al.*, 2018: 24, Article 9.17). Although the use of the term “Type” by Glen & Hardy (2000: 114) arguably could be corrected to “Lectotype” under Turland *et al.* (2018: 23, Art. 9.10), their typification therefore was not effective.

We here designate *Becker s.n.*, Albany Museum No. 7271 [Barcode: GRA0027477] held in GRA as lectotype of *A. pluridens* var. *beckeri*.

Description

Medium-sized to large, shrubby or tree-like plant up to 2.0–3.0(–4.5)m tall. *Stem* simple or branched from the base, middle, or higher up, erect to slightly leaning under weight of rosettes, clothed in persistent, papery, down-curved, dried leaves, exposed portion of stem greyish brown. *Leaves* densely rosulate, spreading to gracefully recurved, shiny, light green to yellowish green, without spots, faintly lineate, surfaces smooth, falcate-lanceolate, 55–70cm long, 5–7cm wide at base; sheaths striate; margin thin, whitish, somewhat cartilaginous, with numerous pearly white to pinkish white to concolorous deltoid teeth curved towards the leaf tip. *Inflorescence* paniculate, usually produced simultaneously or successively, to 1m tall, erect, 1–2-branched from below

middle, branches erect, rarely leaning under weight of densely packed flowers. *Peduncle* stout; with several prominent, scattered, sterile bracts below racemes. *Racemes* distinctly conical, 25–35cm long, dense to subdense; buds erect to horizontal, flowers pendulous at anthesis. *Floral bracts* papery, ovate-deltoid. *Flowers*: pedicellate, pedicels to 35mm long; *perianth* bright orange to salmon pink, rarely reddish or yellow, straight, slightly constricted above ovary, cylindric-trigonus; tips of segments spreading to slightly flared; *stamens* well-exserted, exerted part deep orange to crimson red to purplish; *style* well-exserted. Fruit a capsule, reddish brown.

Cytology

Aloe pluridens is unremarkable in terms of its cytology, having the standard count of $2n = 14$ (Brandham, 1971; Riley & Majumdar, 1979: 47). It is, however, of note because this count is amongst one of the earliest recorded for any species of *Aloe* (Ferguson, 1926; Resende, 1937; Müller, 1945).

Hybrids

Reynolds (1950) records two natural hybrids: *A. pluridens* × *A. africana* (north of Uitenhage) and *A. pluridens* × *A. ferox* (northwest of Carlisle Bridge near Grahamstown).

Aloe pluridens has been used as a parent in a small number of artificially created hybrids. The usually densely flowered, conical racemes of representatives of *Aloe* sect. *Arborescentes* are visually pleasing, or as Reynolds (1950: 406) phrased it as one of the defining characters of *Aloe* sect. *Arborescentes*, “*Inflorescence beautiful*”. The splendour of the symmetrical inflorescences has prompted the regular use of species, especially *A. arborescens*, from this group in the creation of hybrids from which several cultivars have been selected. *Aloe pluridens* has also been used in the parentage of a number of artificially produced garden hybrids. The strikingly beautiful cultivar *Aloe* ‘Spiraal’ (Figure 12) is one of the earliest produced and named by the notable South African *Aloe* cultivar breeder Arthur (At) Koeleman (1915–1994) (Koeleman, 1973). The name refers to the twisted or spiral leaf arrangement. *Aloe* ‘Spiraal’ was derived from a cross between two species from *A. sect. Arborescentes*: *A. mutabilis* and *A. pluridens*. It is intermediate between the two species being predominantly single-stemmed with only a few secondary branches. The flowers are also closer to *A. pluridens* being a uniform orange-red and not bicoloured as is often the case in *A. mu-*

tabilis (Smith & Figueiredo, 2015: iv, v, 13). Another synthetic cross is *Aloe* ‘Struik’ (English: ‘shrub’) (*A. arborescens* × *A. pluridens*) (Smith & Steyn, 2001).

Common names of *Aloe pluridens*

A number of common names have been recorded for *A. pluridens* (Grace *et al.*, 2011: 124), of which the most widely used are ‘fransaalwyn’ [Afrikaans] and ‘French aloe’ [English] (Smith, 1966: 216, 219; Van Wyk *et al.*, 2011: 104). Where the word “French”, or “frans” in Afrikaans, is used in names and terms in South Africa it is often to indicate something that is “different, strange, or deviating” from the norm. About 35 years after the Cape was initially settled in 1652 by the Dutch, on behalf of the Dutch East India Company, French Huguenots arrived in significant numbers in this newly established colony. The French and their customs and culture must have been strange to the Dutch, and labelling an inanimate or animate object, including plants, as “French” is an indication that it deviated from what was known at the time. *Aloe pluridens*, after it had been collected in the Eastern Cape by James Bowie in the early-1820s, was clearly viewed as very different from other aloes known at the time, such as *A. ferox* Mill., which have a similar tree-like growth form. In Afrikaans the common names of plants are written with a lower case initial letter, as in ‘fransaalwyn’, while in English the convention is to write common names that include a noun with an initial title case letter, as in ‘French aloe’.

Cultivation

In Europe seedlings of *A. pluridens* grow reasonably fast (Figure 11) and, unlike the experience of Berger (1900), seedlings in the collection of one of us (CCW) readily produce basal branches. Jeppe (1969) reports that in South Africa “This handsome aloe grows well in cultivation if given enough protection from the hot sun and from frost”.

As is the case with most species of *Aloe* that produce basal sprouts, or branch or sprout higher up, *A. pluridens* is mostly propagated vegetatively. The perfectly formed plantlets that develop on the exposed part of the stem and branches often produce roots while still attached to a plant. These sprouts grow exceedingly easily and will rapidly become firmly rooted if planted in a well-drained, friable soil mixture. Especially when still immature, plants generally benefit from being protected from intense irradiation.

Acknowledgements

Patricia Long, Julia Buckley, Lynn Parker, and Kiri Ross-Jones of the Art Collections and Information section of the Library, Art & Archives Division of the Royal Botanic Gardens, Kew, Richmond, Surrey, United Kingdom, generously assisted with accessing and imaging the painting of *A. pluridens* by George Bond held by that institution. The Director and the Board of Trustees, Royal Botanic Gardens, Kew, are thanked for granting permission for the reproduction of the *A. pluridens* plate in this paper.

Harry Smith, Herb. K, Royal Botanic Gardens, Kew, is thanked for searching the collections for material referable to *A. atherstonei*.

Ms. Serena K. Marner, Herbarium Manager, Oxford University Herbaria, Department of Plant Sciences, Oxford University, is thanked for searching the OXF collections for material of *A. pluridens*.

Prof. A.E. [Braam] van Wyk, University of Pretoria, SA, is thanked for permission to use the base map used here for the geographical distribution map of *A. pluridens*, and for interesting discussions on the common names of this species.

We are grateful to Tony Dold (Schonland Herbarium, Grahamstown, South Africa) for kindly providing access to scarce literature and specimens held at GRA.

Roy Mottram, UK, is thanked for providing scans and JPEGs of the articles by Berger (1900) and Phillips.

Literature cited

- BAKER, J.G. (1881). A synopsis of Aloineae and Yuccoideae. *J. Linn. Soc. Bot.* **18**: 148–240.
- BAKER, J.G. (1896). *Aloe*. In: W.T. THISELTON-DYER (ED.), *Flora capensis*. Vol. **6**: 302–329. L. Reeve & Co., London.
- BERGER, A. (1900). *Aloe pluridens* Haw. *Monatsschr. Kakt.-kunde* **10**: 137–139.
- BERGER, A. (1905). Über die systematische Gliederung der Gattung Aloë. *Bot. Jahrb. Syst.* **36**: 42–68.
- BERGER, A. (1908). 8. *Aloe* L. In: A. ENGLER (ED.), *Liliaceae-Asphodeloideae-Aloineae*. *Das Pflanzenreich* IV. 38. III. II. Heft **33**: 159–326. Verlag von Wilhelm Engelmann, Leipzig.
- BLUNT, W. & STEARN, W. T. (1994) *The art of botanical illustration*. Antique Collectors' Club/Royal Botanic Gardens, Kew.
- BORNMAN, H. & HARDY, D.[S.] (1971). *Aloes of the South African veld*. Voortrekkerpers, Johannesburg.
- BOWIE, J. (1830). *Botany. S. Afr. Quart. J.* **1**: 90–91.
- BRANDHAM, P.E. (1971). The chromosomes of the Liliaceae: II. *Kew Bull.* **25**: 381–399.
- CARTER, S., LAVRANOS, J.J., NEWTON, L.E. & WALKER, C.C. (2011). *Aloes. The definitive guide*. Kew Publishing, Royal Botanic Gardens, Kew/British Cactus & Succulent Society.
- CHRISTIAN, H.B. (1933). Notes on African aloes. Parts VII. to XII. *Rhod. Agri. J.* (905): 1–16, [tt.1–18].
- CLOKIE, H. N. (1964). *An account of the herbaria of the Department of Botany in the University of Oxford*. Oxford University Press, Oxford.
- DESMOND, R. (1995). *Kew. The history of the Royal Botanic Gardens*. Harvill Press/Royal Botanic Gardens, Kew.
- FERGUSON, N. (1926). The Aloinae: a cytological study, with especial reference to the form and size of the chromosomes. *Phil. Trans. Roy. Soc. London* **215**: 225–253, tt. 18–19.
- GLEN, H.F. & HARDY, D.S. (2000). Aloaceae (First part): *Aloe*. In: G. GERMISHUIZEN (ED.), *Flora of southern Africa* Vol. **5**, Part **1**, Fasc. **1**: 1–167. National Botanical Institute, South Africa.
- GLEN, H.F. & SMITH, G.F. (1995). Notes on the typification of some species of *Aloe* (Asphodelaceae/Aloaceae). *Bothalia* **25**: 37–42.
- GRACE, O.M., KLOPPER, R.R., FIGUEIREDO, E. & SMITH, G.F. (2011). *The aloe names book*. *Strelitzia* **29**. South African National Biodiversity Institute, Pretoria, and Royal Botanic Gardens, Kew.
- GROENEWALD, B.H. (1941). *Die aalwyne van Suid-Afrika, Suidwes-Afrika, Portugees Oos-Afrika, Swaziland, Basoetoeland, en 'n spesiale ondersoek van die klassifikasie, chromosome en areale van die Aloe Maculatae*. Die Nasionale Pers Beperk, Bloemfontein.
- GUNN, M. & CODD, L.E. (1981). *Botanical exploration of southern Africa*. 1st ed. A.A. Balkema, Cape Town.
- HAWORTH, A.H. (1824). L. Decas secunda novarum Plantarum Succulentarum. *Phil. Mag.* **64**: 298–302.
- HIGGINS, V. (1960). *Succulents in cultivation cacti included*. Blandford Press, London.
- HUNT, D. (1988). Kew exhibit of drawings of succulents by Thomas Duncanson & others. *IOS Bull.* **4**: 253–256. (Reprinted in *Excelsa* **14**: 162–164, 1989.)
- HUTCHINSON, J. (1946). *A botanist in southern Africa*. P.R. Gawthorn, London.
- JACOBSEN, H. (1960). *A handbook of succulent plants*. Vol. **1**. Blandford Press Ltd, London.
- JACOBSEN, H. (1974). *Lexicon of succulent plants*. 1st edn. Blandford Press Ltd, London.

- JEPPE, B. (1969). *South African aloes*. Purnell & Sons S.A. (Pty) Ltd, Cape Town.
- KLOPPER, R.R. (2015). *Contributions to the systematics of the genus Aloe L. (Asphodelaceae: Aloioideae) in southern Africa*. PhD thesis. University of Pretoria, Pretoria.
- KLOPPER, R.R. & SMITH, G.F. (2010). The genus *Aloe* L. (Asphodelaceae: Aloioideae) in the Eastern Cape Province of South Africa. *Haseltonia* **16**: 16–53.
- [KOELEMAN, A.] (1973). Registration of *Aloe* cultivars. *Aloe* **11**(4): 46–48.
- MARLOTH, R. (1915). *The flora of South Africa with a synopsis of the South African genera of phanerogamous plants. IV*. Darton Bros. & Co., Cape Town / Wheldon & Wesley Ltd., London.
- MÜLLER F.S. (1945). 'n Chromosoomstudie van 'n aantal spesies van die genus *Aloe* Linn. Publikasies van die Universiteit van Pretoria, Reeks II: Natuurwetenskap No. 8, Pretoria.
- NEWTON, L.E. (2001a). *Aloe*. In: U. EGGLI (ED.), *Illustrated handbook of succulent plants: Monocotyledons*, pp. 103–186. Springer-Verlag, Berlin.
- NEWTON, L.E. (2001b). *Aloe*. In: U. EGGLI (ED.), *CITES Aloe & Pachypodium checklist*. The Trustees of the Royal Botanic Gardens Kew, and Sukkulanten-Sammlung, Zürich.
- PHILLIPS, E.P. (1936). *Aloe pluridens*. *Flow. Pl. S. Afr.* **16**: t. 610.
- RESENDE, F. (1937). Über die Ubiquität der SAT-Chromosomen bei den Blütenpflanzen. *Planta* **26**: 757–807.
- REYNOLDS, G.W. (1950). *The aloes of South Africa*. The Aloes of South Africa Book Fund, Johannesburg.
- RILEY, H.P. & MAJUMDAR, S.K. (1979). *The Aloineae. A biosystematic survey*. The University Press of Kentucky, Lexington, Kentucky.
- ROWLEY, G.D. (1997). *A history of succulent plants*. Strawberry Press, Mill Valley, California.
- SALM-DYCK, J.F.M.A.H.I. VON. (1836–63). *Monographia generum aloes et mesembryanthemi*. Maximilian Cohen & Son, Bonn.
- SCHÖNLAND, S. (1903). On some South African species of *Aloe*, with special reference to those represented in the Herbarium of the Albany Museum (with descriptions of two new species). *Rec. Albany Mus.* **1**: 33–47, t. III.
- SCHULTES, J.A. & SCHULTES, J.H. (1829). *CAROLIA LINNÉ equitis Systema vegetabilium*. **7**(1): 631–715. Sumtibus J.G. Cottae, Stuttgartardiae.
- SMITH, C.A. (1966). *Common names of South African plants*. E.P. PHILLIPS & E. VAN HOEPEN, (Eds.), Memoirs of the Botanical Survey of South Africa **35**: 1–642. Department of Agricultural Technical Services, Botanical Research Institute, Pretoria.
- SMITH, G.F. & FIGUEIREDO, E. (2014). The Hanbury Gardens at La Mortola in Italy: a perfect setting for succulents. *Cact. Succ. J. (U.S.)* **86**: 12–19.
- SMITH, G.F. & FIGUEIREDO, E. (2015). *Garden aloes. Growing and breeding cultivars and hybrids*. Jacana Media (Pty) Ltd., Johannesburg.
- SMITH, G.F. & STEYN, E.M.A. (2001). Noble aloes: a case study of *Aloe* 'Spiraal'. *Alst. Int.* **1**(3): 3–4.
- SMITH, G.F. & VAN WYK, A.E. (1989). Biographical notes on James Bowie and the discovery of *Aloe bowiea* Schult. & J.H. Schult. (Aloioideae: Asphodelaceae). *Taxon* **38**: 557–568.
- SMITH, G.F. & VAN WYK, B. [A.E.] (2008). *Aloes in southern Africa*. Struik Publishers, Cape Town.
- TURLAND, N.J., WIERSEMA, J.H., BARRIE, F.R., GREUTER, W., HAWKSWORTH, D.L., HERENDEEN, P.S., KNAPP, S., KUSBER, W.-H., LI, D.-Z., MARHOLD, K., MAY, T.W., MCNEILL, J., MONRO, A.M., PRADO, J., PRICE, M.J. & SMITH, G.F. (2018). *International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code) adopted by the Nineteenth International Botanical Congress Shenzhen, China, July 2017*. Koeltz Botanical Books, Oberreifenberg. [Regnum Vegetabile **159**].
- VAN WYK, A.E. & SMITH, G.F. (2001). *Regions of floristic endemism in southern Africa. A review with emphasis on succulents*. Umdaus Press, Hatfield, Pretoria.
- VAN WYK, B.[A.E.], VAN DEN BERG, E., COATES PALGRAVE, M. & JORDAAN, M. (2011). *Dictionary of names for southern African trees. Scientific names of indigenous trees, shrubs and climbers with common names from 30 languages*. Briza Publications, Queenswood, Pretoria.
- VAN WYK, B.-E. & SMITH, G.F. (2014). *Guide to the aloes of South Africa*. 3rd edition. Briza Publications, Queenswood, Pretoria.